

an endoscope having a solid-state imaging device whose sensitivity can be varied by providing a plurality of pulsating driving signals so as to change an electron multiplication rate;

a signal processing unit for processing a signal output from said solid-state imaging device;

33
(cont.) a light source unit for irradiating light to an object so that an object image will be projected on said solid-state imaging device;

switch means for causing transmission of excitation light from said light source unit to an object at spectral frequencies enabling object image observation at one of visible wavelengths or fluorescent wavelengths; and

a sensitivity control means for varying a sensitivity control pulse, applying it to said solid-state imaging device, and thus controlling the electron multiplication rate for said solid-state imaging device according to object image observation wavelength.

34
10. (Twice Amended) An endoscope system according to Claim 4, wherein the information representing a feature of a connected endoscope with which said sensitivity control means may be controlled is input at an input means.

11. (Twice Amended) An endoscope system according to Claim 1, wherein said signal processing unit includes a means that when an output signal of said solid-state imaging device is lower than a set voltage level, amplifies a gain to be given to the signal.

Please add new Claims 20-33.

BS

~~20.~~ (New) An endoscope system according to Claim 1, wherein the solid-state imaging device comprises an electron multiplication mechanism in which impact

ionization occurs due to the pulsating driving signals applied, and electrons produced under control of the number of pulses per unit time or amplitudes of the pulsating driving signals are multiplied to vary the sensitivity thereof.

21. (New) An endoscope apparatus according to Claim 20, wherein the electron multiplication mechanism is provided at each pixel location or at an immediately preceding detection amplifier stage.

22. (New) An endoscope apparatus according to Claim 1, wherein the solid-state imaging device comprises a first solid-state imaging device for detecting the object image in fluorescent light, and a second solid-state imaging device for detecting the object image in visible light.

23. (New) An endoscope system comprising:

an endoscope having a solid-state imaging device to which a plurality of pulsating signals are applied and of which the sensitivity is varied by multiplying electrons produced;

a signal processing unit for processing an output signal from the solid-state imaging device;

a light source unit for irradiating light to an object so that an object image will be projected on the solid-state imaging device; and

a sensitivity control device for varying the pulsating signals, applying them to the solid-state imaging device, and thus controlling the electron multiplication rate for the solid-state imaging device.

24. (New) An endoscope system according to Claim 23, wherein, when the electrons produced are multiplied, the sensitivity of the solid-state imaging device is varied without reducing the effective period during which electrons are accumulated as compared to the case in which the sensitivity is not varied.

25. (New) An endoscope system according to Claim 23, wherein the solid-state imaging device comprises an electron multiplication mechanism in which impact ionization occurs due to the pulsating signals applied, and electrons produced by the control of the number of pulses or amplitudes of the pulsating signals are multiplied to vary the sensitivity thereof.

BS
cont.

26. (New) An endoscope system according to Claim 25, wherein the electron multiplication mechanism is provided at each pixel location or at a preceding stage of a detection amplifier.

27. (New) An endoscope system according to Claim 23, wherein the sensitivity control device supplies sensitivity control pulses during a reading period of the solid-state imaging device.

28. (New) An endoscope system according to Claim 27, wherein the light source unit comprises:

a lamp for irradiating light to the object;

a filter member provided in an optical path between the object and the lamp and having a filter to transmit the light from the lamp to irradiate the object and interceptive areas to intercept the light from said lamp and, a mechanism for arranging the filter and the interceptive areas of the filter member in the optical path,

wherein the sensitivity control device supplies the pulsating signals to the solid-state imaging device when the interceptive areas of the filter are arranged in the optical path.

29. (New) An endoscope system according to Claim 27, wherein the light source unit further includes:

an irradiation light switching device for switching between ordinary light to perform observation under ordinary light and excitation light to perform observation under special light to irradiate the object, wherein the sensitivity control device renders the electron multiplication rate of the solid-state imaging device different according to whether the excitation light is irradiated to the object or whether the ordinary light is irradiated to the object.

30. (New) An endoscope system according to Claim 28, wherein the filter member comprises a rotary filter member having a first filter to transmit the light from said lamp to irradiate the ordinary light to the object, and a second filter to irradiate the special light to the object, said mechanism for arranging the filter further comprising:

a motor to rotate the rotary filter; and

a filter switching means for switching between the first filter and the second filter arranged in the optical path to switch between the ordinary light and the special light to

be irradiated to the object, wherein the sensitivity control device renders the electron multiplication rate of the solid-state imaging device different between the ordinary light and the special light.

31. (New) An endoscope system according to Claim 30, wherein the sensitivity control device varies the pulsating signals such that the electron multiplication rate of the solid-state imaging device in the observation under special light when the special light is irradiated to the object is made larger than that in the observation under ordinary light when the ordinary light is irradiated to said object.

32. (New) An endoscope system according to Claim 31, wherein the light source unit comprises:

an iris diaphragm which adjusts light level to the light irradiated to the object;
and,

an iris diaphragm controller for controlling the iris diaphragm wherein the iris diaphragm controller controls the iris diaphragm such that the iris diaphragm is opened when the light irradiated to the object is switched by the filter switching means from the ordinary light to the special light.

33. (New) An endoscope system comprising:

an endoscope having a solid-state imaging device to which a plurality of pulsating signals are applied and of which the sensitivity is varied by amplifying charge carriers produced;

a signal processing unit for processing an output signal from the solid-state imaging device;

a light source unit for irradiating light to an object, the light source unit includes a lamp for irradiating light to the object;

a filter member provided between the object and the lamp and having a first filter to transmit the light from the lamp to irradiate ordinary light to the object and a second filter to irradiate excitation light to the object;

a switching device for switching between the first filter and the second filter so as to selectively arrange the first filter and the second filter between the object and the lamp;

an iris diaphragm which adjusts light level of the light irradiated to the object and an iris diaphragm control device for controlling the iris diaphragm;

a mode switching device for switching between observation under ordinary light to irradiate ordinary light to the object by arranging the first filter between the object and the lamp and observation under special light to irradiate excitation light to the object by arranging the second filter between the object and the lamp; and

a sensitivity control device for varying at least the number of pulses or amplitudes of the pulsing signals to be applied to the solid-state imaging device so as to vary the sensitivity of the solid-state imaging device between the observation under ordinary light and the observation under special light,

wherein the iris diaphragm control device controls the iris diaphragm opening when the light irradiated to the object is switched by the filter switching mechanism from the ordinary light to the special light.

REMARKS

Reconsideration of the above-identified application is respectfully requested.